

Aortic valve calcification is a major cause of valve failure in the elderly population and incurs enormous cost for valve replacement surgeries. In this disease, calcium and mineral deposits form on the aortic valve, resulting in narrowing at their opening to the aorta. This reduces blood flow and causes inefficient function or failure of the aortic valve and might also lead to other cardiovascular disease. The aortic valve consists of three cusps and is found between the left ventricle and the aorta. The three cusps are known as the left coronary, right coronary and non-coronary cusps. Interestingly, calcification frequently initiates at the non-coronary cusp of aortic valves before affecting the coronary cusps. The aim of this study is to characterize valvular cells among the three cusps in terms of their calcific properties. Our hypothesis is that valvular cells from non-coronary cusp will calcify more than those from the other cusps. To prove this, valvular cells were isolated from each of the cusps in aortic valves from two different porcine hearts. The cells from each cusp were then cultured in calcification-inducing or osteogenic media. Von Kossa and Alizarin Red stainings, and alkaline phosphatase assay were then conducted on these samples to compare the calcification over time and between the cusps by collecting samples on days 4, 7, 10, and 14. Our data suggests a positive correlation between calcification and the duration of exposure to osteogenic media for all three cusps. Additionally, valvular cells from the non-coronary cusps expressed greater amounts of calcific marker than the coronary cusps. Further research will therefore investigate underlying mechanism of valvular calcification and improve our understanding of valve biology and pathology.